

SERIAL NO.: 08/525,655  
FILING DATE: September 29, 1995

DOCKET NO.: 524-2385-0 PCT

the invention. No new matter has been added.

REMARKS

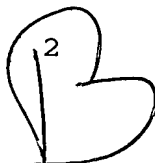
Claims 1-7 are pending in this application. Reconsideration is respectfully requested.

The present invention is drawn to a process for dyeing cellulose-containing textiles with indigo. It has now been found that by introducing an aqueous leuco indigo solution into a dyebath, rather than vatting indigo with reducing agents, significantly lower amounts of reducing agents can be used in the dyebath, resulting in waste water having a much lower sulfate content. Thus, the method of the present invention is economical, and environmentally sound. Moreover, the aqueous leuco indigo solutions of the present invention, in contrast to the alkaline solutions of indoxyl used in the prior art, are surprisingly stable under air-excluding conditions, and are highly soluble.

The rejection of the claims under 35 USC 103 as being unpatentable over Fono et al. in view of Herz et al. and/or Rogovik et al. is respectfully traversed.

The dyeing process of Fono et al. is carried out with a stock vat which is prepared in a conventional manner by reducing indigo first to its leuco form with sodium dithionite in the presence of aqueous alkali. This stock solution is aged for 12 hours (time consuming process) and stabilized with an aldehyde

2



compound. Fono et al. does not disclose or suggest the use of catalytic hydrogenation as is specifically required by the claims.

While it is true that Herz et al. enumerates catalytic hydrogenation as a possible reduction process for preparing the leuco dyestuff, the dyestuff of Herz et al. is a thioindigoide and not a leuco indigo solution. Herz et al. does not suggest that a leuco indigo solution could be used directly for dyeing textiles.

Herz et al. discloses dyestuff pastes for textile printing which contain a leuco thioindigo dyestuff and which are stabilized with a salt of an organic acid as a dispersing agent. These dyestuff pastes are prepared by milling the isolated reduced thioindigoide dyestuff in the presence of glycerol, a salt of an organic acid and water. In contrast, the dyestuffs of the present invention are produced by merely clarifying a reduced leuco indigo solution and introducing the solution into tanks under air-excluding conditions and under an inert gas.

The method of Herz et al. differs from the method of the present invention because Herz et al. discloses a printing process with leuco dyestuffs pastes which differ from the present leuco dyestuff solutions, and moreover, because the process of Herz et al. uses thioindigoides and not indigo itself. Thus, the combination of Fono et al. and Herz et al. cannot render the present claims obvious.

Rogovik et al., like Herz et al., is directed to thioindigo

dyestuffs and not to the indigo dyestuffs of the present invention. Additionally, the leuco dyes of Rogovik et al., which are prepared by catalytic hydrogenation, must then be converted to sulfate esters to be used for the dyeing process. Thus, although, as the Examiner noted, catalytic hydrogenation of dyestuffs to produce the leuco forms is a conventional practice, none of the cited documents, alone or in combination, recognized that leuco indigo solutions could be used directly for dyeing purposes.

In fact, those skilled in the art at the time of the present invention feared that leuco indigo solutions would not be stable (and storable) and, therefore, they would not have been motivated to use these leuco indigo solutions for dyeing textiles (p. 2, lines 33-36 of the specification).

Furthermore, the high solubility of the leuco indigo solutions of the present invention advantageously results in a reduction of the vat dye volume to be added to the dyebath (p. 3, lines 1 - 8 of the specification). Additionally, dyeing with the present aqueous leuco indigo solutions gives reproducible results, whereas the preparation of the conventional stock vats often leads to fluctuations in the dyeings. The present dyeing process produces brilliant dyeings in a distinctly more environmentally benign manner than conventional indigo dyeings (p. 6, line 38 to p. 7, line 4 of the specification).

Thus, the combination of Fono et al., Herz et al. and Rogovik et al. does not render the present claims obvious.

SERIAL NO.: 08/525,655  
FILING DATE: September 29, 1995

DOCKET NO.: 524-2385-0 PCT

Withdrawal of this rejection is therefore respectfully requested.


The rejection of the claims under 35 USC 112, second paragraph, has been obviated by amendment.

Applicant submits the present application is now in condition for allowance. Early notification of such action is earnestly solicited.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, P.C.

Crystal Square Five  
Fourth Floor  
1755 Jefferson Davis Hwy.  
Arlington, VA 22202  
(703) 413-3000  
Fax: (703) 413-2220

  
Norman F. Oblon  
Registration No.: 24,618  
Attorney of Record

Sharon E. Crane, Ph.D.  
Registration No.: 36,113